Technical Proposal: [redacted]

STAT

TECHNICAL PROPOSAL FOR THE DEVELOPMENT OF THE S1010 PILOT'S PROTECTIVE ASSEMBLY

29 September 1965

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SECTION I

1.1 OBJECTIVES

The proposal briefly outlines and describes a Pilot's Protective Assembly (Full Pressure) intended to replace the Partial Pressure Flying Assembly that is presently in service. The primary objective is to determine if the Pilot's Protective Assembly (Full Pressure) will provide greater comfort for missions of longer duration. It is anticipated that it will provide better physiological protection, in the event of cabin decompression, by maintaining the pilot at a lower altitude. In the event of water immersion, this assembly will give the individual more anti-exposure protection than the partial pressure suits now in use. This Pilot's Protective Assembly has been designed to integrate with the present aircraft system with few minor changes.

SECTION II

TECHNICAL DISCUSSION

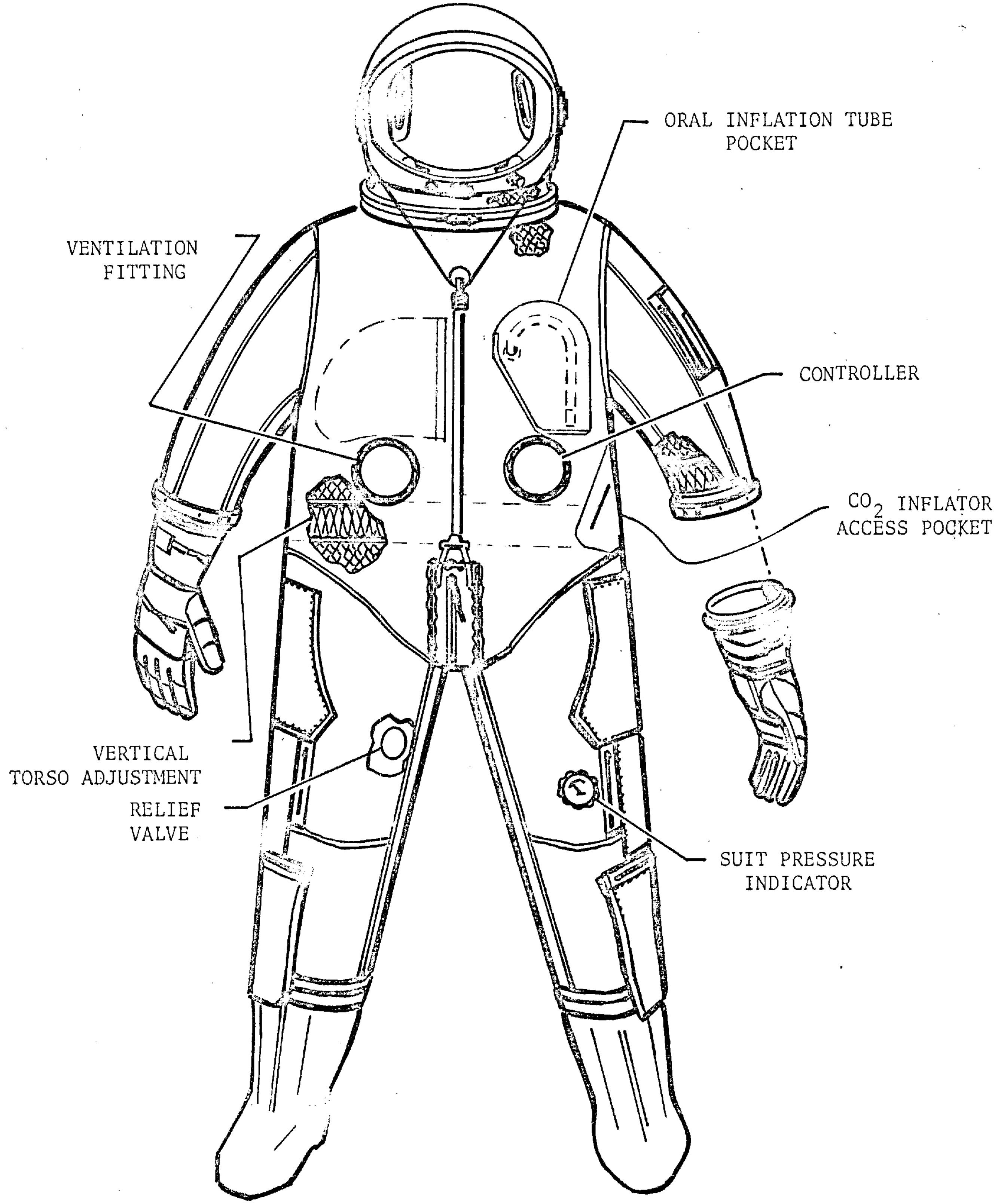
2.1 TORSO ASSEMBLY (Figure 1)

The design of the assembly will include the following major sub-assemblies and functional systems:

2.1.1 Restraint Assembly

The restraint assembly will be constructed of HT (high temperature) nylon Link-Net. The assembly will be made to the Air Force twelve (12) size height/weight sizing program. The restraint assembly will incorporate lacing adjustments for inter-range personal fit which facilitates vertical and circumferential torso sizing, as well as important leg and sleeve adjustments (Figure 2). The rear entry coverall will utilize a pressure sealing closure which may also serve as a relief opening.

The helmet disconnect assembly will be designed to rest on the subject's shoulders and reduce the weight normally supported by his head. A small molded sponge support shall act as a cushion between the disconnect and shoulders.



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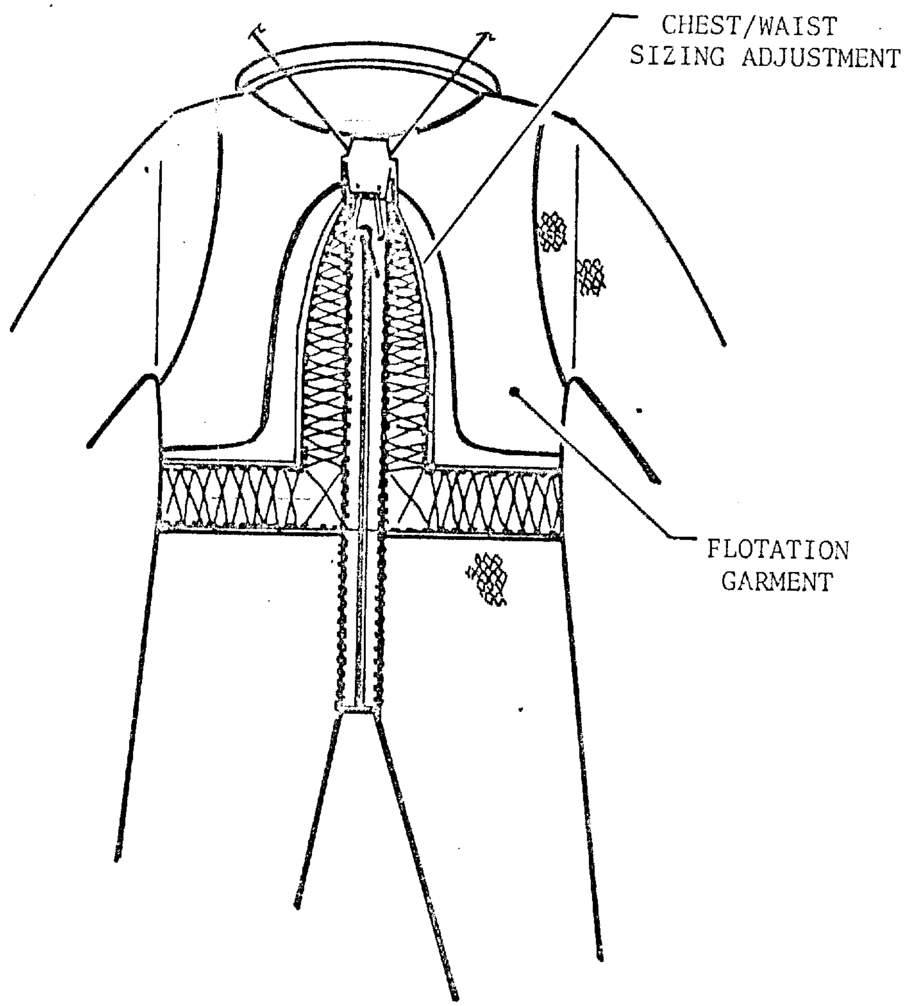
PILOT'S PROTECTIVE ASSEMBLY

Figure 1



RESTRAINT AND FLOTATION GARMENT (REAR VIEW)

Figure 2

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2.1.2 Liner and Ventilation System (Figures 3 and 4)

The liner will be constructed of sage green nylon oxford and fabricated in such a manner as to facilitate removal for laundering, gas container inspection, and maintenance.

The ventilation system, which is designed for compatibility with aircraft ventilation systems, is of the standard channel configuration. Vent gas will enter the assembly's right side and flow to the ankles, helmet neck ring, and glove disconnects. The ventilation gas will be channeled from the helmet disconnect to the helmet liner where it is dispersed (by means of ventilation openings in the liner) around the head, neck, and shoulder region. From the glove disconnects the gas will be channeled to the base of the fingers where it will be dispersed and allowed to flow back over the hands and arms to the suit controller outlet.

2.1.3 Restraint Cover and Flotation Unit (Figure 5)

The restraint cover will function as a coverall. Pocket arrangement will be similar to that of the S-633 lightweight coverall. To improve flight safety in the event of flash fire, three (3) ounce HT Nomex

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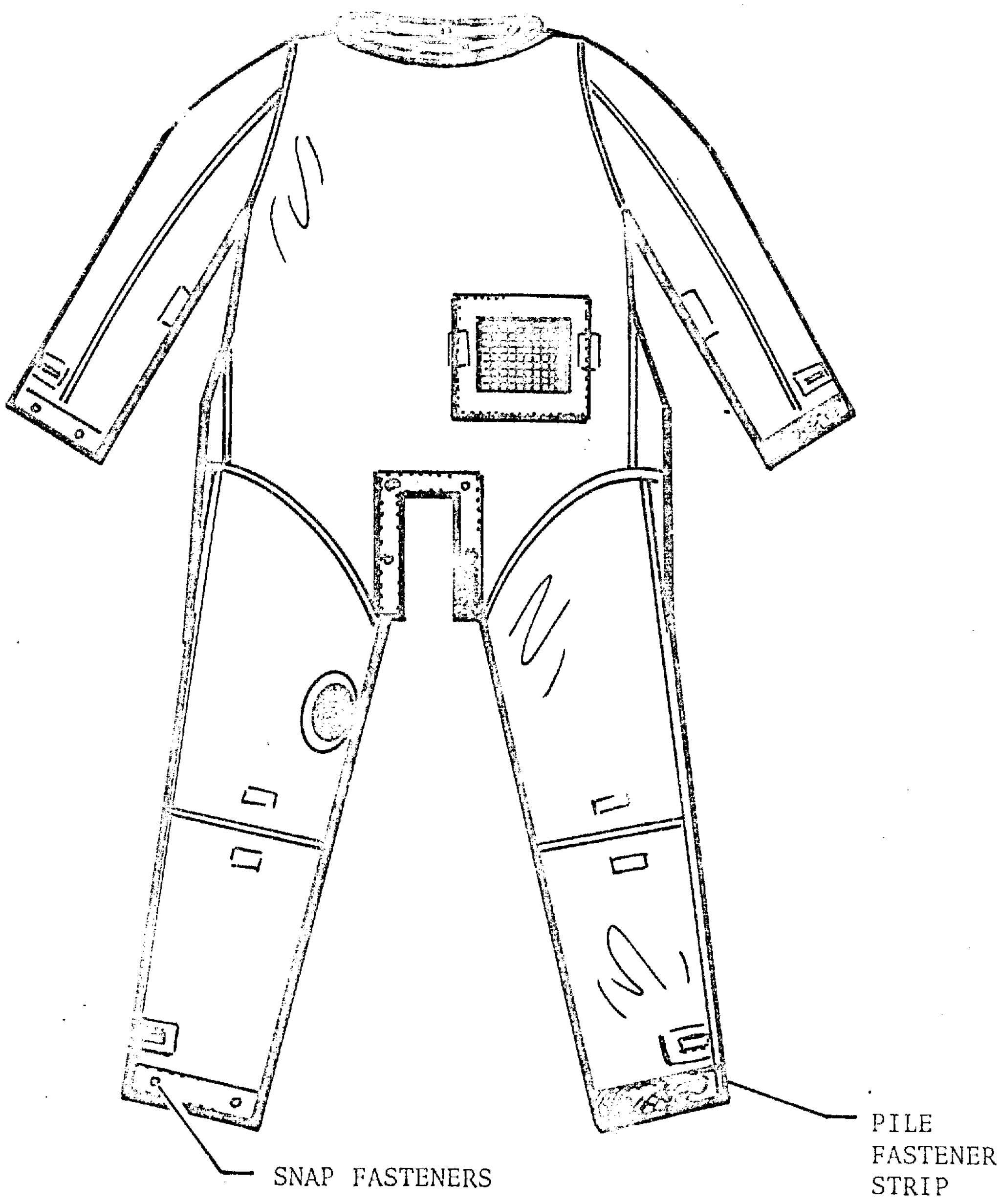
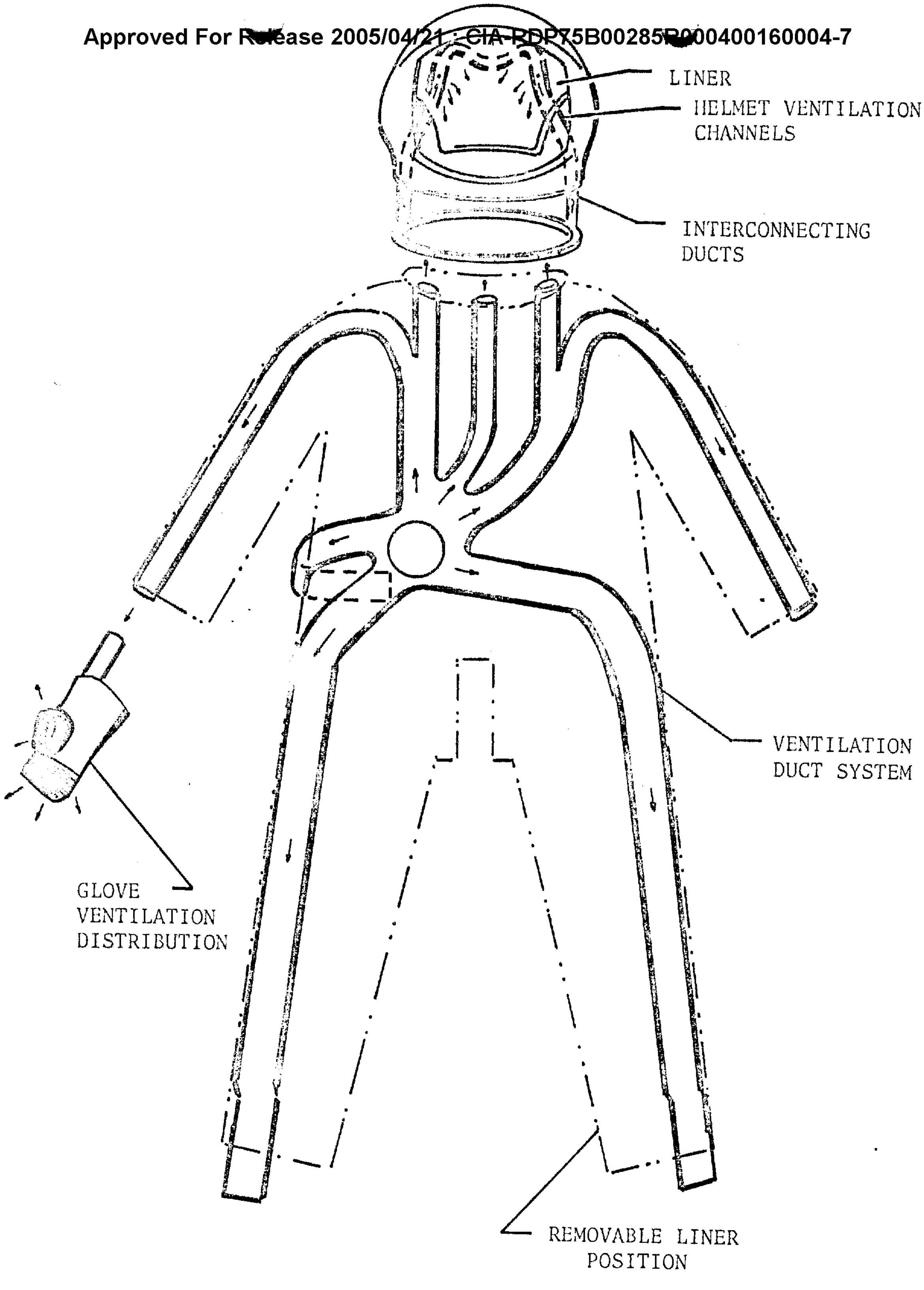


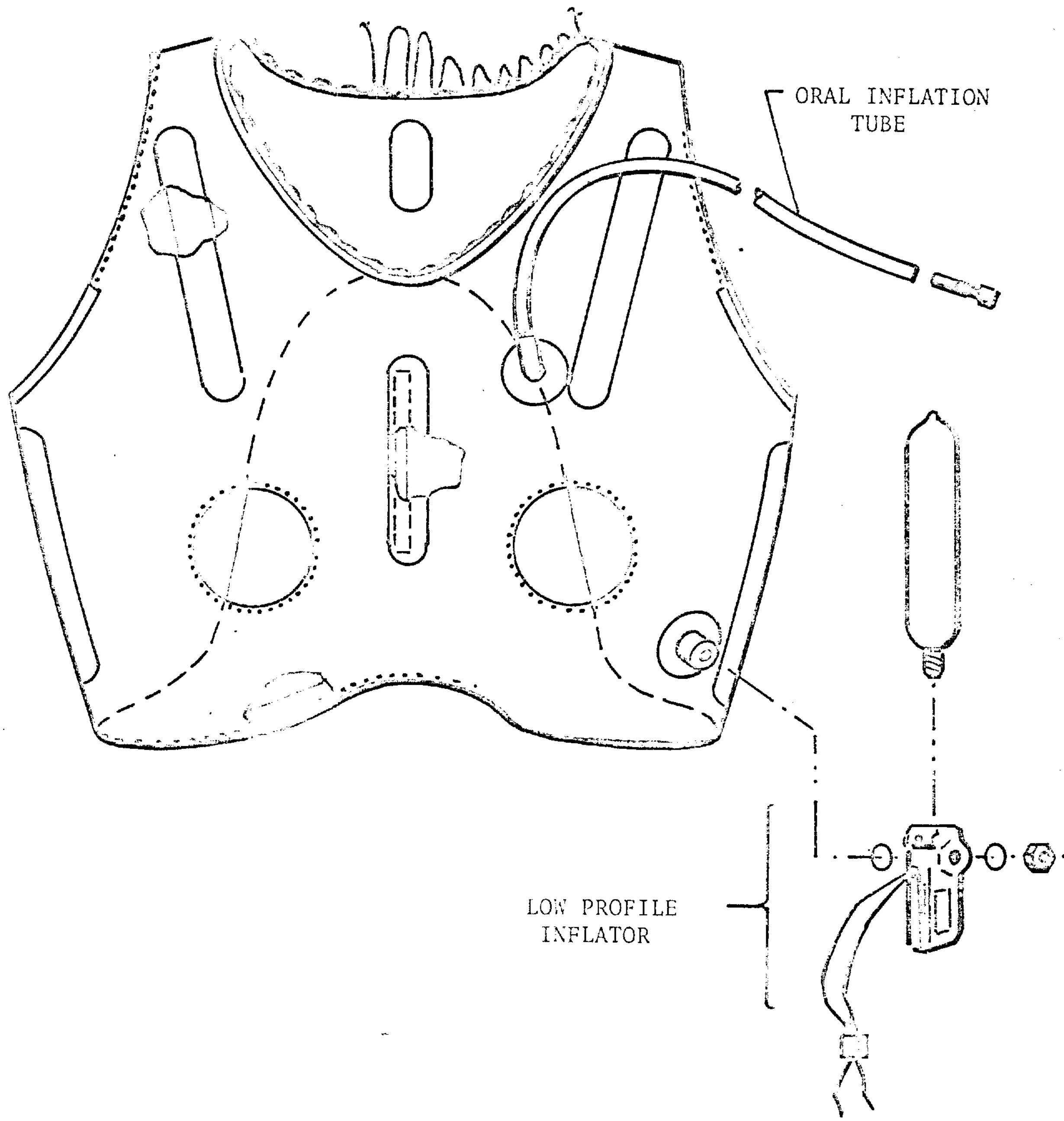
REMOVABLE LINER

Figure 3



VENTILATION

Figure 4



FLOTATION GARMENT

Figure 5

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cloth will be used to fabricate the cover, rather than the standard three and a half ($3\frac{1}{2}$) ounce nylon oxford. Olive green is the commercially available color most applicable to your program and therefore, the color we propose to use.

2.1.4 Suit Controller

The suit controller will be pilot/aneroid operated. The controller is designed to utilize the suit/ambient pressure differential for pressure control. Utilizing this design will eliminate the requirement for hoses or high pressure gas connections at the controller. The aneroid is programmed to maintain a suit pressure equivalent to an approximate altitude of 35,000 feet.

The controller will be mounted to the suit by screwing it onto the suit mounting ring and securing by means of a ring nut. This type of integration facilitates controller removal for service or replacement (Figure 6).

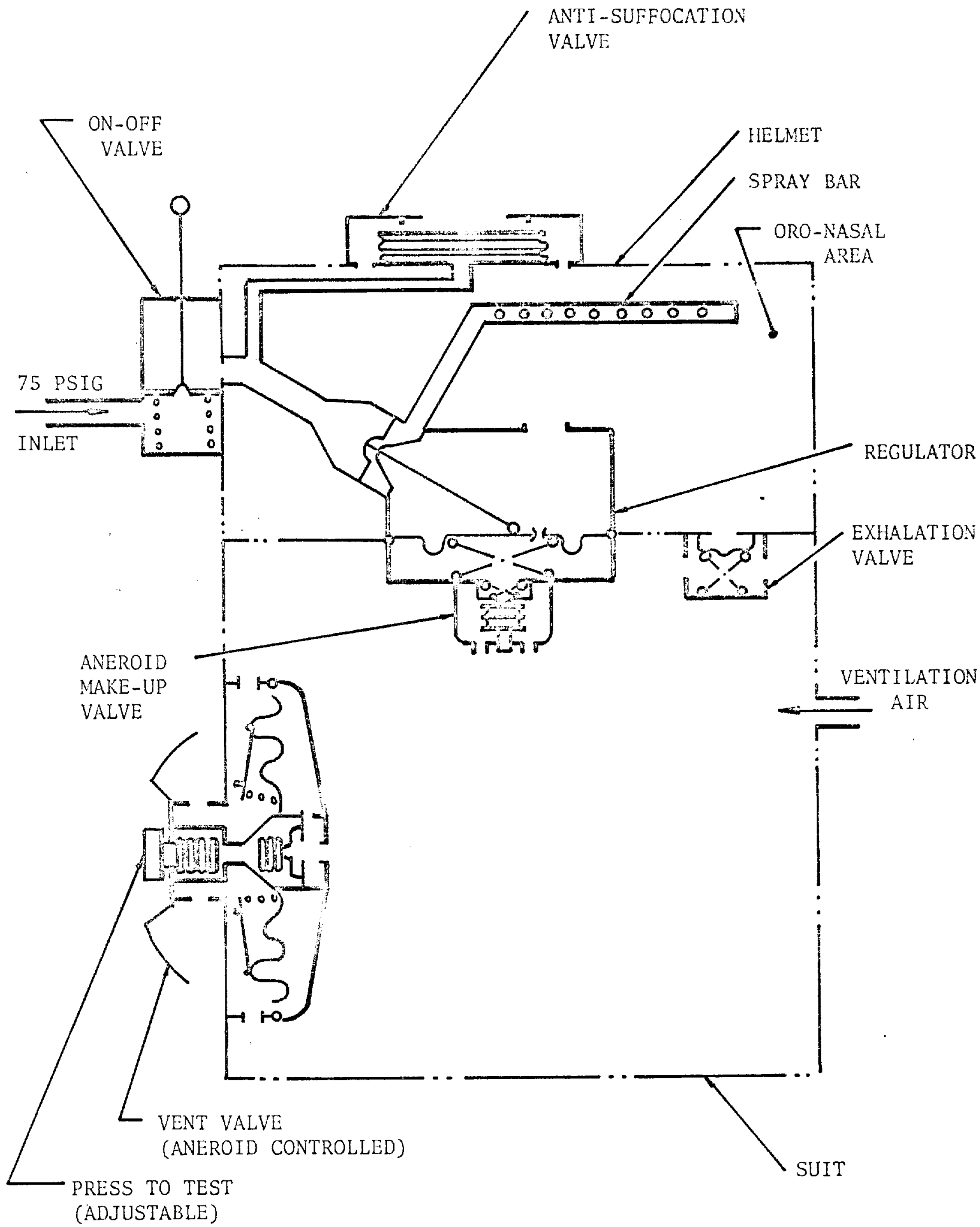
2.1.5 Oxygen System

The present kit mounted oxygen regulator will be replaced with a 75 pound reducer. Oxygen gas will travel through the helmet 0^2 hose to the left rear of the helmet. Plumbing will provide oxygen to an On-Off valve then directly to the breathing regulator. The regulator will discharge oxygen through a spray bar and sense breathing pressure in the oro-nasal cavity. The suit controller is designed to maintain a suit pressure equivalent of approximately 35,000 feet. Should additional pressurization be necessary the aneroid operated make-up valve will cause the helmet regulator to discharge oxygen, thereby building up and maintaining desired suit pressure.

The oxygen On-Off valve is installed on the left side of the helmet. The valve is situated in such a manner as to be activated by a cam on the "ear" of the visor when the visor is in the closed position. When the visor is in the raised position the valve closes off the flow of oxygen.(Figure 6).

2.1.6 Anti-Suffocation Valve

This valve will be mounted in the shell on the left



SCHEMATIC SUIT SYSTEM

Figure 6

front side under the visor opening. It provides a port through the shell for passage of ambient air into and out of the helmet when the oxygen supply pressure drops below 20 psi. When the oxygen system is pressurized the valve will automatically close and seal the helmet from ambient.

2.2 HELMET ASSEMBLY (Figure 6)

The design of the helmet will be similar to the HGK-13/P22S-2 with the following modifications:

A. A lightweight fiberglas shell.

B. A sunshade and a lightweight heated visor.

C. A static seal rather than pneumatic seal.

D. A visor actuated On-Off oxygen valve.

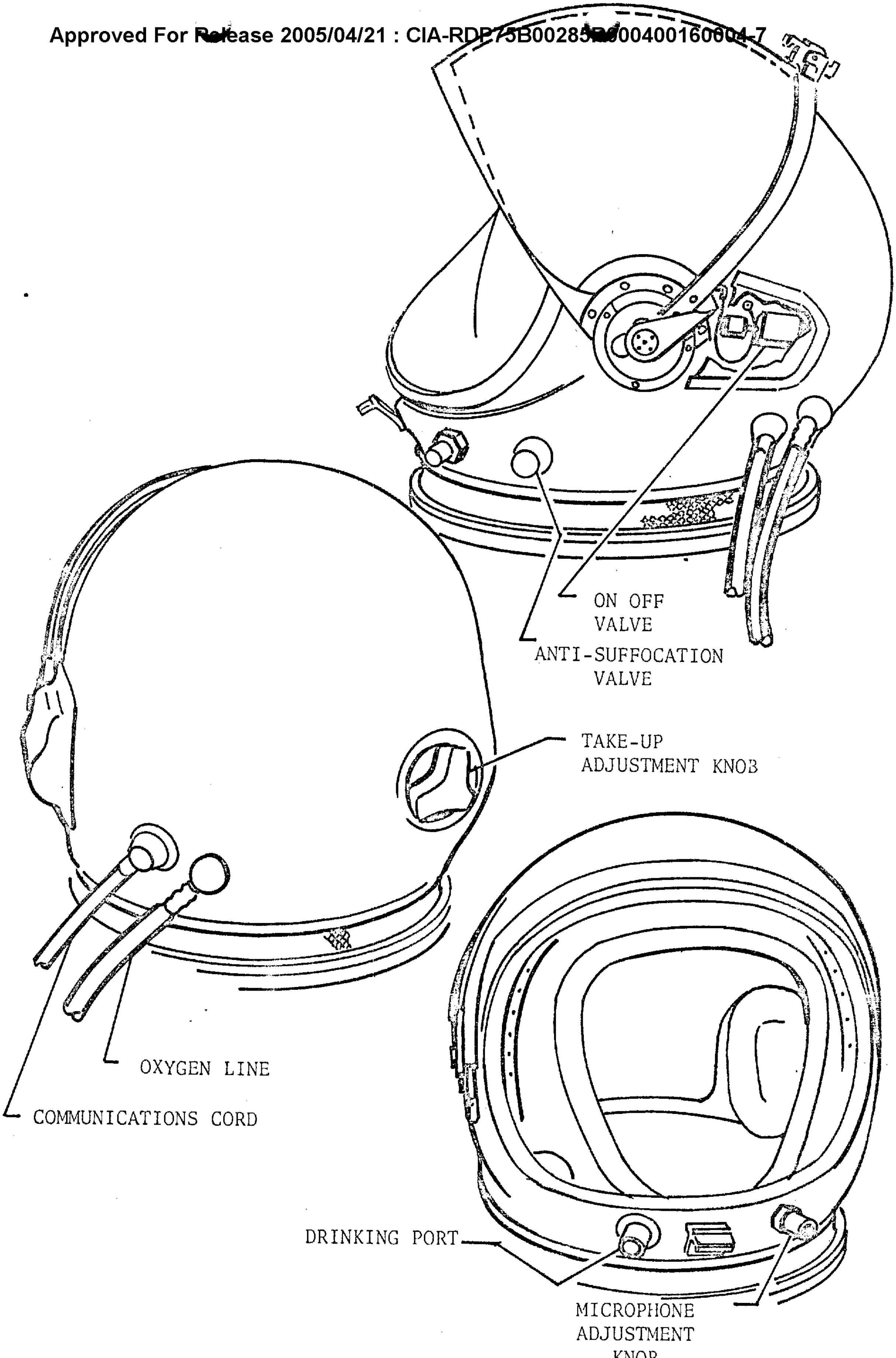
E. A single demand oxygen regulator and make-up valve.

F. A ventilated helmet liner (available in three sizes).

G. An externally adjustable microphone.

H. An inflight drinking port.

I. A Link-Net section will extend from the base of the helmet to the neck disconnect. By lowering the neck disconnect as proposed, it is believed comfort of the unit will be improved as well as



HELMET

Figure 7

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helmet mobility.

2.3 GLOVE ASSEMBLY

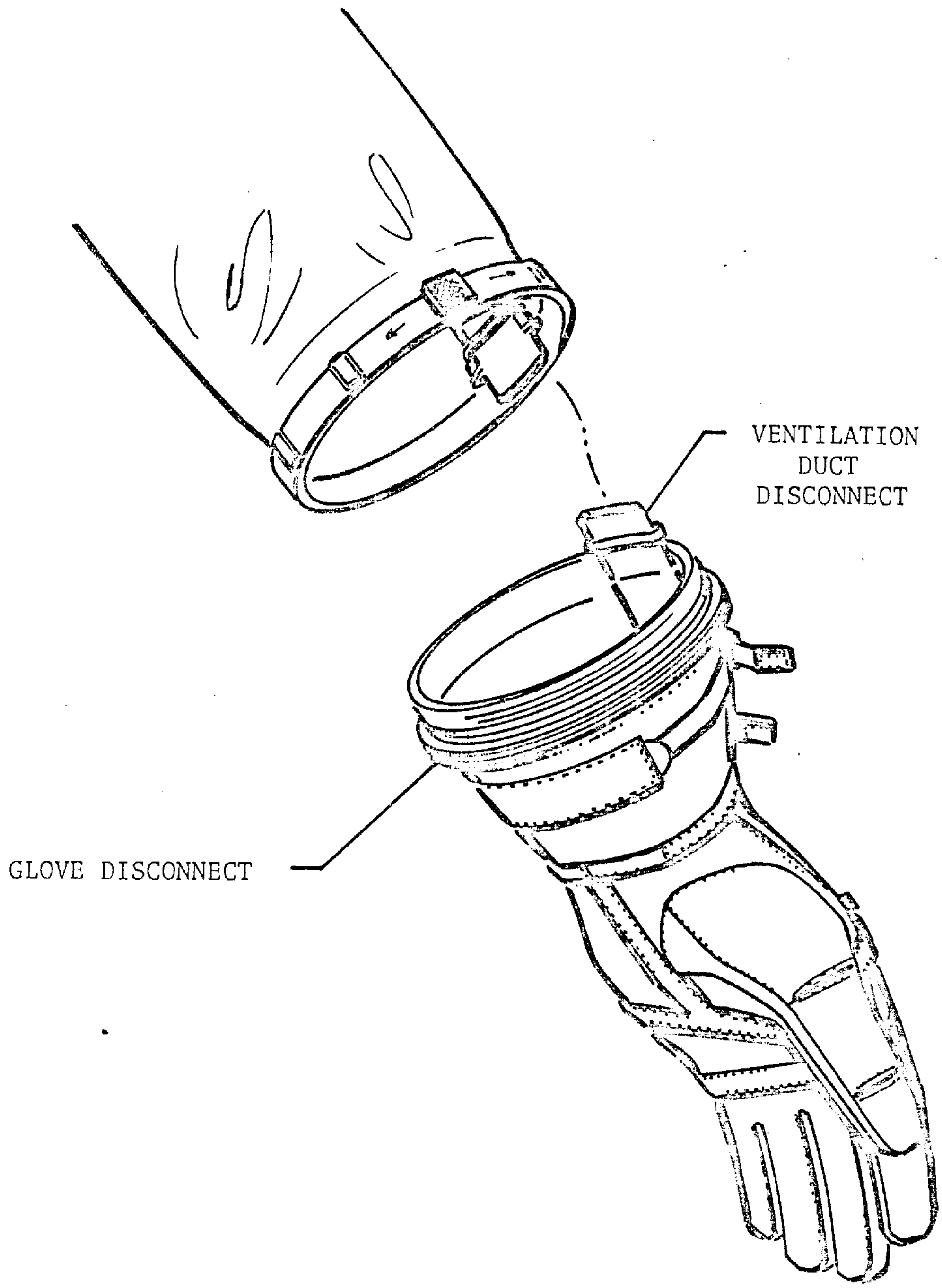
The full pressure gloves we propose to use with this assembly are ones that have evolved from a presently active glove development program with the Air Force.

The major advantages to these gloves as compared to other full pressure gloves are:

A. Improved ventilation

B. Greater sensitivity

C. Quicker and more efficient donning capabilities



GLOVE VENTILATION SYSTEM

Figure 8